TRAVEL ANALYSIS REPORT

YAMPA RANGER DISTRICT
Medicine Bow-Routt National Forests
Garfield, Grand, Rio Blanco and Routt Counties, Colorado

United States
Department of
Agriculture
Forest Service

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Abstract:
This Travel Analysis Report documents a route-by route analysis of all National Forest System roads and motorized trails on the Yampa Ranger District and recommends the minimum road system needed for public access and efficient forest management. This report also documents whether changes to motorized trail designations are recommended. The analysis area is the Yampa Ranger District, which includes portions of the Routt and Arapaho National Forests, Colorado. The Yampa Ranger District is administered by the Medicine Bow-Routt National Forests.

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EXECUTIVE SUMMARY

This document is the Travel Analysis Report (TAR) for areas administered by the Yampa Ranger District on the Routt and Arapaho National Forests. The Travel Analysis Report documents a route-by-route analysis of National Forest System roads and motorized trails on the District and recommends the minimum road system needed for public access and efficient forest management. This report also documents the analysis of whether changes to motorized trail designations are recommended.

The outcome of the TAR is a set of science-based recommendations for potential future changes to the forest transportation system to meet on-going management objectives. These recommendations are based on an analysis of the physical, biological, social, and economic risks and benefits of system roads and motorized trails.

Travel Analysis is intended to inform subsequent National Environmental Policy Act (NEPA) processes, allowing individual projects to be more site-specific and focused, while still addressing cumulative impacts. The Travel Analysis Process (TAP) neither produces decisions nor allocates National Forest System lands for specific purposes. It merely provides the analytical framework from which to make recommendations that may then be examined in the NEPA process. It describes current conditions, risks, benefits, opportunities (need for change), and priorities for actions. Future NEPA analyses that include public involvement may carry forward, reject or change the recommendations in the report, and provide the basis for making specific transportation system related decisions.

Summary of Issues

Issues were identified using previous public involvement and internal Forest Service input and are discussed in more detail in Step 3.

- Insufficient resources for maintenance of the existing system of roads and trails
- Access needs, including motorized recreation use, access and connectivity to a variety of recreational opportunities, access for forest management, and emergency access
- Environmental impacts, including current conditions and maintenance or repair costs, impacts to water resources, soil and geological hazards, fragmentation and wildlife security, impacts to vegetation (particularly invasive species), and impacts to cultural resources
- Social impacts, including impacts to recreationists wanting to recreate in areas not directly under the influence of motorized use as well as those who prefer motorized opportunities.

Analysis

A risk-benefit assessment was used to rank system roads and motorized trails on the District based on *risks* (road/trail condition/maintenance and repair costs, impacts on water resources, soil/geologic hazards, wildlife habitat, invasive species, cultural resources, and social conflict potential) and *benefits* (motorized recreation use, recreation access/connectivity, forest management, and emergency access). The categories chosen to rank risks and benefits were based on issues identified in Step 3 and by criteria set by the Interdisciplinary Team (IDT) in Step 5.

Key Results and Findings

Through the Travel Analysis Process, the IDT ranked routes based on their *risks* to natural, social, economic and cultural resources and their *benefits* to recreation use, forest management access, and emergency access. Each road was then further evaluated to determine if it was needed as part of the minimum road system. Opportunities for changes to roads and motorized trails are:

- Approximately **265** miles of **roads** in the current system (70%) have high to medium benefits and should be regularly maintained to mitigate and prevent resource risk.
- Approximately **107** miles of **roads** in the current system (28%) have greater risk than benefit, and should be considered for decommissioning, closure, or mitigation to reduce resource risk.
- Approximately **40** miles of **roads** are recommended to be closed or decommissioned.
- All **27** miles of **motorized trails** in the current system have medium benefits and should be regularly maintained to mitigate and prevent resource risk.

The figures above are not additive, meaning a road can be in multiple categories as identified above. For example, a road can have a medium benefit (first bullet) and a high risk (second bullet).

How the Report will be Used

The Yampa District Travel Analysis Report will assist in addressing issues related to the road and motorized trail systems. It will be used to inform future site-specific analyses, decisions, and specific actions. Travel analysis is an ongoing process and it is anticipated that this document will be referenced for and updated by future analyses.

INTRODUCTION

Travel Management Rule

In 2005, the US Forest Service adopted the Travel Management Rule. The rule changes the way the Forest Service regulates motor vehicles on National Forests and Grasslands. The Travel Management Rule requires that National Forests identify their minimum road system and designate roads, trails and areas for motor vehicle use. This means that after the designation process is complete, which includes an opportunity for public comment, Forest visitors will be able to operate motor vehicles only on the roads, trails, and areas that have been designated. The designations will not only list what roads, trails, and areas can be used, but also what types of vehicles can be used, and what time of year they can be used.

There are some exceptions to these designations, which include persons with a Forest Service permit authorizing the otherwise prohibited act, any Federal, State or local law enforcement officer, or member of an organized rescue or firefighting force engaged in the performance of an official duty, and Forest Service administrative use.

The objective of the Travel Management Rule is not to limit access to the Forest, but to protect the Forest from unmanaged use. The Forest Service must strike a balance in managing all types of activities. To this end, a designated system of roads, trails, and areas for motor vehicle use, established with public involvement, enhances public enjoyment of the National Forests while maintaining other important values and uses on National Forest System lands. The Travel Management Rule works to manage current use so future generations can continue to enjoy access to our National Forest System lands.

The travel management regulations (36 CFR 212.5(b)) require the Forest Service to "identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands"; and to identify roads "no longer needed to meet forest resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails".

Travel Analysis Process

This Travel Analysis Process (TAP) is a broad, comprehensive look at the transportation network. The main objectives are:

- Balance the need for access while minimizing risks by examining important resource, social, and economic issues related to roads and motorized trails;
- Furnish maps, tables, and narratives that display transportation management opportunities and strategies that address future access needs and environmental concerns;
- Identify the need for change by comparing the current road and motorized trail system to the desired condition; and
- Make recommendations to inform decisions in subsequent NEPA documents.

This is an iterative, not a one-time, process. When conditions change, additional analysis may point to the need for revisions. In fact, a travel management route designation process will likely result in additional information and, perhaps, decisions that will then be reflected in changes to the recommendations in this report.

Before the Forest Service adopted the Travel Management Rule, the Roads Analysis Process described in Forest Service Manual 7712.1 and publication FS-643, *Roads Analysis; Informing Decisions about Managing the Transportation System* was used. A Roads Analysis Report (RAP) analyzing maintenance level 3, 4, and 5 roads across the Routt National Forest was completed in May 2003. The 2003 RAP recommended some changes in Road Maintenance Objective but did not recommend removal of any maintenance level 3, 4 or 5 roads from the road system. The Bear River Travel Management Analysis and other site-specific project decisions made with public input and evaluation of resource impacts have implemented changes to the road system since 2003.

This 2015 Travel Analysis Report revises and updates the Routt National Forest Roads Analysis Report for all roads managed by Yampa District. The Travel Analysis Process consisted of six steps:

1. Analysis Design
2. Background
3. Issues
4. Benefits and Risks
5. Opportunities and Priorities
6. Minimum Road System

The Report is NOT a decision. Travel *Analysis* provides only an analytical framework from which to make recommendations. NEPA includes formal public involvement which enables agencies to make decisions.

Forest Plan Direction

The 1997 Routt National Forest Revised Land and Resource Management Plan, herein after referred to as Forest Plan, establishes programmatic direction for the management of National Forest System lands. The Routt Forest Plan identifies specific management areas (MAs), which provide management direction by, emphasizing a particular resource and identifying associated guidelines (prescriptions) for management activities. Yampa District includes 16 different MAs, encompassing everything from Wilderness areas (MA 1.11) to Utility Corridors/Electronic Sites (MA 8.22). See Table 1 below for a list of MAs. Applicable Forest-wide transportation General Direction statements, as well as transportation direction for MAs can be found in Appendix A. Note, however, (Table 1), not all MAs have transportation direction; only MAs with transportation direction are identified in Appendix A.

The analysis and recommendations in this report are all consistent with Forest Plan direction.

Table 1: Yampa District Management Areas[1]

MA	Resource Emphasis
1.11	Wilderness, Pristine
1.12	Wilderness, Primitive
1.13	Wilderness, Semi-primitive
1.32	Backcountry Recreation, Non-motorize with Limited Motorized Use in Winter
1.5	National River System, Wild Rivers Designated and Eligible
2.1	Special Interest Areas
2.2	Research Natural Areas
3.31	Backcountry Recreation-Year-round Motorized
4.2	Scenery
4.3	Dispersed Recreation
*5.11	General Forest and Rangelands, Forest Vegetation Emphasis
*5.12	General Forest and Rangelands, Range Vegetation Emphasis
*5.13	Forest Products
5.41	Deer and Elk Winter Range
*7.1	Residential/Forest Interface
8.22	Utility Corridors, Electronic Site

[1] *Lacks transportation related direction

STEP 1: ANALYSIS DESIGN

Analysis Area

The analysis area for this project is the Yampa Ranger District, which is approximately 393,310 acres in size. About 367,020 acres (93%) are National Forest System lands. The remaining 27,290 acres are private (25,903 acres) and State (1,388 acres) lands within the boundaries of the National Forest. Twenty-two percent (22%) of the analysis area is within congressionally designated Wilderness. Although road and trail recommendations are limited to routes under Forest Service jurisdiction on the Yampa District, the IDT considered roads, resources, and recreational opportunities on adjacent lands and under other jurisdictions in this analysis.

Interdisciplinary Team

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Doug Myhre, Range/Invasive Species
Randy Tepler, Soils
Missy Dressen, Wildlife
Paula Guenther, South Zone Coordination

Analysis Plan

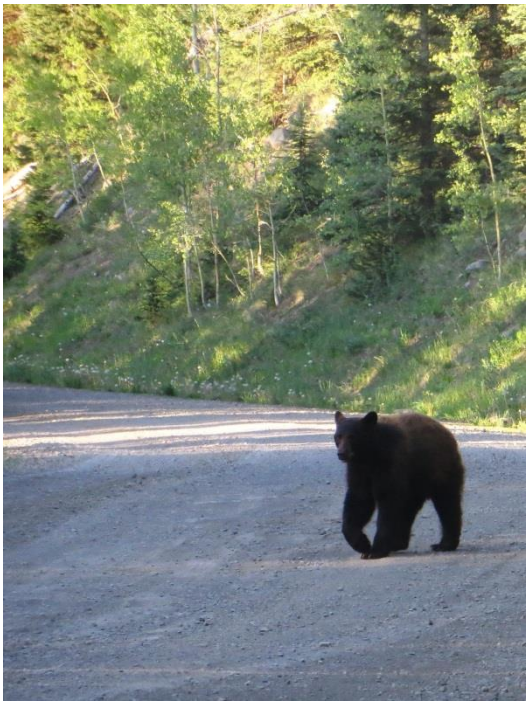
To complete the analysis, the IDT:

- Reviewed and assembled existing data.
- Verified accuracy of system road and motorized trail locations on maps.
- Identified discrepancies between on-the-ground conditions and the Forests' INFRA and GIS databases. Documented and corrected where possible these data discrepancies.
- Where possible, verified the current conditions of roads and motorized trails, including safety issues, surface type and environmental impacts.
- Identified preliminary access and resource issues, concerns, and opportunities through previous public involvement and internal resource staffs.
- Performed the analysis concurrently with other plans and projects ongoing on the District.
- Recommended changes to the road and motorized trail systems based on the findings of the analysis to identify the minimum road system and improve the management of forest resources.

Information Considered by the IDT

- Actual location and condition of system roads and motorized trails. A complete inventory of **non**-system routes was not conducted.
- Maintenance responsibility.
- Assessment of previous and current opportunities, problems and risks for all roads and motorized trails.
- Soil, hydrology, vegetation, invasive species, wildlife, and cultural resources where they are impacted by roads and/or motorized trails.
- Areas of special sensitivity, resource values, or both.
- Public access and recreational needs and desires in the areas, including access for nearby landowners.
- Conflicts among users, public access, user safety, and accessibility.
- Anticipated future levels of motor vehicle use and changes in motor vehicle technology.

- Transportation needed for Forest management activities.
- Transportation investments to meet land management plan objectives.
- Current road and motorized trail uses.
- Economic costs and benefits.
- Road and motorized trail management objectives.
- Best management practices.
- Forest Plan and other management direction.
- Agency objectives and priorities.
- Interrelationship with other governmental jurisdictions.
- Applicable federal, state, and local laws.
- Public user group values and concerns.
- Forest-wide and project level road and motorized trail analyses.
- Previous District decisions regarding travel management.



STEP 2: BACKGROUND

Road Management

The transportation system on the Routt National Forest serves a variety of resource management and access needs. Most roads were constructed for commercial access, such as timber harvest, grazing, and mining. Others resulted from water storage and transmission projects for municipal water supplies, and/or to provide access to private lands. Some were created specifically to provide access for a wide variety of recreation activities.

National Forest System Roads (NFSR, or Forest Roads) are managed in accordance with Road Management Objectives (RMO) for each road. RMOs stipulate the uses for which a road was originally designed and is currently managed, as well as maintenance intensity and frequency, and anticipated future use. All Forest Roads are also assigned a specific maintenance level. Roads may be maintained at one level now but at a different level in the future. The assigned maintenance level considers current needs, road condition, budget constraints, and environmental concerns. The desired objective maintenance level may be the same as, higher, or lower than, the operational maintenance level. On the Yampa District, the operational maintenance level is usually the same as its objective.

Discussions about roads in this Report use standard Forest Service maintenance level (ML) terminology: ML 1 (closed roads); ML 2 (suitable for high clearance vehicles); ML 3 (suitable for passenger cars); ML 4 (suitable for passenger car at moderate speeds); and ML 5 (paved, or chip sealed). Locally, ML 1 and 2 roads are usually native surface, and ML 3 and 4 roads usually have gravel.

Trail Management

Many of the District's trails evolved through repeated use by grazing permittees and other forest users and visitors; some were designed and constructed by Forest Service employees or contractors. The majority of motorized trails on the District were "grandfathered" by virtue of historic motorized use at a time when such use was not regulated, but some were developed specifically to provide a motorized trail experience.

Like roads, National Forest System Trails (NFST) are managed in accordance with Trail Management Objectives (TMOs) established for each trail. Trail classes range from 1, the most undeveloped, to 5, highly developed. Design

parameters and maintenance frequencies are based on the trail class and level of development. Routine maintenance typically includes route marking, removal of fallen trees, brushing, and drainage.

In general, summer trails are designed and managed for hiker/pedestrians, pack and saddle stock, bicycles, motorcycles, and/or all-terrain vehicle (ATVs). The design of any specific trail is based on the most intensive use. For example, ATV trails are the most intensive, followed by stock-use trails, while hiker/pedestrian trail are the least intensive in design. In many cases, trails are managed for multiple uses (e.g. an ATV trail that is open and managed for all other uses).

It should be noted that following the implementation of the Travel Management Rule, trail terminology relating to accepted and prohibited uses was refined and differs slightly from the terminology used in the original Trail Management Objectives. On the Yampa District, ORV trails are open to vehicles 50" or less and motorcycles. Motorized trails do not allow use by full-size, 'street-legal' cars and trucks, such as jeeps and pickups, regardless of their width. Those vehicles may only be used on roads designed and designated as Maintenance Level 2 or higher (open). In all cases, travel is restricted to the designated road and/or trails; cross-country travel is prohibited.

Geographic Information System and Corporate Database

The agency's GIS and corporate database ("INFRA") catalogs information about each road and trail. INFRA, specifically, includes information such as the road or trail number, length, beginning and ending locations, ownership, surface type, etc. The database also lists road features, such as culverts, switchbacks, signs, waterbars, cattle guards, and gates, along with maintenance records.

As part of this 2015 TAP/TAR, the District has tried to ensure that the GIS and INFRA databases match what is actually on the ground. All motorized system trails on the District have been field-verified. However, not all Level 1 and non-system roads have been field-verified, and in some places, features that are not roads are still incorrectly identified as such. Some of these are fence lines, ditches, or other non-roads that looked like roads on the old aerial photos; others are unauthorized or user-created routes that were never intended to be included in the system. There are probably many more unauthorized routes that are not even mapped. As problems or mistakes are discovered, corrections to the databases will continue.

Since 2000, trail inventories and condition surveys have been done for most of the District's trails. As a result, most alignments have been corrected using GPS data, and features documented in INFRA.

Existing Direction

Travel analysis focuses on identifying needed changes to the forest transportation system. In general terms, the existing direction describes how National Forest roads and trails are currently managed for motor vehicle use. Seasonal and other restrictions, prohibitions, and closures are part of the existing direction, which is displayed on the Yampa District Motor Vehicle Use Map (MVUM). MVUMs are available for free from local Forest Service offices and at http://www.fs.usda.gov/main/mbr/maps-pubs.

State, counties, other Federal agencies, and private entities sometimes control roads that cross National Forest lands through easements from the Forest Service. Easements issued to other entities are generally not managed as National Forest System Roads.

Road mileages on the Yampa District are displayed in Table 2. Of the nearly 380 miles of roads on the District, approximately 21 miles are closed during the winter and spring to protect road surfaces and other resources. Mileages in Table 2 have been rounded to the nearest whole mile.

Table 2: Existing System Roads and Motorized Trails

Roads	Miles
Maintenance Level 5	0
Maintenance Level 4	33
Maintenance Level 3	76
Maintenance Level 2	68
Maintenance Level 1	203
Total System Roads	380
Motorized Trails	
Open to All Vehicles	27
Single-Track Motorized Trail	0
Total Motorized Trail	27

STEP 3: KEY ISSUES

Issues were generated from public responses to past NEPA specific project proposals and discussions with other public agencies, land owners and special use permittees. Key issues identified by Forest Service personnel and previous public comments are, in no particular order:

Insufficient Resources for Maintaining Existing Roads and Motorized Trails

Inadequate maintenance reduces access for National Forest users and management, accelerates soil erosion (ruts don't allow water to run off), and degrades water quality and aquatic habitat by increasing sediment. Current funding for road and trail maintenance is inadequate to maintain the existing system and is not expected to improve.

Access

Motorized vehicle access, of many types, is needed to provide recreational opportunities, efficiently manage the Forest, and provide access for emergency response.

- Motorized Recreation: Roads and motorized trails are used by Forest visitors for sightseeing, 4-wheel driving, ATV, UTV, and motorcycle riding. Recent travel management analyses, formal and informal public input, and anecdotal evidence suggest that opportunities for motorized recreation on trails are not fully meeting user demand. A lack of loops and single-track trails are the primary concerns cited by users.
- Recreation Access/Connectivity: Roads and motorized trails also provide access to numerous other recreational activities such as hiking, camping, hunting, firewood gathering, rock collecting, and connection to other roads and trails.
- Forest Management: Roads, and to a lesser extent motorized trails, provide access for timber harvest, grazing, noxious weed treatment, etc.
- Easements and Authorizations: Roads provide legal access to inholdings and facilities managed under easements, rights of way, and other special use authorizations.
- Emergency Access: Roads, and some motorized trails, provide emergency access during fire suppression, search and rescue, and medical response.

Environmental Impacts

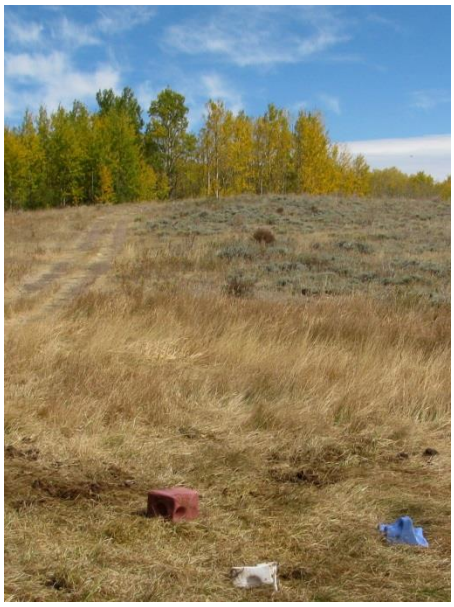
- Impacts to water resources: Erosion and sediment from roads and motorized trails in areas with perennial, intermittent, and ephemeral stream channels or wetlands can impair the ecological and hydrologic function of drainage channels;

- Soil and Geologic Hazards: Much of the analysis area has highly erosive soils that are extremely susceptible to compaction, rutting, gullying, and development of mud holes. Some soils are also susceptible to mass movement, such as landslides.
- Fragmentation and wildlife security: Motorized routes fragment wildlife habitat, create barriers to movement, reduce habitat capability to sustain populations, and increase disturbance to animals.
- Impacts to vegetation: Motor vehicle use may cause the spread of invasive species by dispersing seed sources.
- Impacts to cultural resources: Motorized use can impact cultural resources.

STEP 4: BENEFITS AND RISKS

The risk and benefit criteria identified in Table 3, below, were developed by considering

- Key issues from Step 3 above,
- Information in previous roads analysis reports, including the 2003 Routt National Forest Roads Analysis Report, and
- Additional knowledge and information from District staff.



Criteria and Rankings Used in the Risk and Benefit Analysis

As mentioned before, roads and motorized trails provide access for many users. However, they can also have negative effects on natural and cultural resources, and often exceed maintenance and repair allocations. The IDT identified the following risks and benefits as the most important resource issues for our transportation system.

Table 3: Road and Motorized Trail Risks and Benefits

Risks	Benefits
• Condition/Maintenance and Repair Costs • (Lack of or inadequate) Aquatic Organism Passage • Water Quality • Soil/Geologic Hazards • Wildlife • Invasive Species • Cultural Resources • Social Conflicts (trails only)	• Motorized Recreation Use • Recreation Access/Connectivity • Forest Management Access (Range, Timber and Special Uses) • Emergency Access

As shown in Appendices E & F, each member of the IDT evaluated each road and motorized trail for each of these risks and benefits, assigning a numerical value (1 for Low, 2 for Medium, and 3 for High). This was based on data in GIS layers, maintenance and repair cost data in INFRA, and professional knowledge of the routes, their resource impacts and benefits for various uses. Assignment of the High, Medium, or Low rating for each category generally followed the following guidelines.

Table 4: Road and Motorized Trail Risk and Benefit Guidelines

ISSUE	RATING	CRITERIA GUIDELINES
RISKS		
Condition/Maintenance and Repair Costs	High	High level of maintenance and repair based on the presence of 3 or more of the following: washboarding; surface deterioration; landslides; slumping; slope raveling; drainage problems; rutting or gullying; mud holes; poor condition of drainage structures or culverts; and design deficiencies.
	Medium	Moderate level of maintenance and repair based on the presence of 2 or more of the above conditions.
	Low	Little or no maintenance and repair needed; no existing damage or just 1 of the above conditions present. Condition fair or better.
Water Resources	High	Greater than 25% of road/trail within 300' of streams and water bodies, or 100' of wetlands, or connected to them. Or roads in watersheds with road densities > 2.4 miles per square mile, or watersheds where road maintenance BMPs are applied to less than half the roads.
	Medium	10-25% of road/trail within 300' of streams and water bodies, or 100' of wetlands, or connected to them. Or roads in watersheds with road densities 1.0 - 2.4 miles per square mile, or watersheds where BMPs applied to 50%-75% of roads.
	Low	<10% of road/trail within 300' of streams and water bodies, or 100' of wetlands, or connected to them. Or roads in watersheds with road densities <1.0 mile per square mile, or watersheds where BMPs applied to > 75% of roads.
Soil/Geologic Hazards	High	Road/trail damage from landslides, slumps, mudflows, rock fall, retaining wall failure, gullying, or soils that are unstable or extremely susceptible to erosion.
	Medium	Minor road/trail damage from soil or geologic hazards.
	Low	No known damage from soil or geologic hazards.
Wildlife	High	High level of motorized and non-motorized use on roads/trails in highly roaded area.
	Medium	Moderate level of use on roads/trails in moderately roaded area.
	Low	Low level of motorized and non-motorized use on roads/trails in minimally roaded area.
Invasive Species	High	Numerous populations of noxious weeds in vicinity of route.
	Medium	Some known populations of noxious weeds in vicinity of route.
	Low	No or few populations of noxious weeds near route.
Aquatic Organism Passage (AOP)	High	Roads have 2 or more stream crossings that impede any life stage aquatic organism passage at any flow level.
	Medium	Roads that have 1 stream crossing that impede any life stage aquatic organism passage at any flow level.
	Low	Roads that do not impede AOP.

ISSUE	RATING	CRITERIA GUIDELINES
RISKS, continued		
Cultural Resources	High	Sites eligible to the National Register of Historic Places (NRHP) or sites that have not yet been evaluated for nomination to the NRHP within a 300' corridor along roads/trails. Areas within 300' of roads/trails that have "high" predictive level (rating 7 - 9) for presence of prehistoric cultural resources; AND little or no archaeological survey (NOTE: to be adequately surveyed, 75%+ of the 300' corridor must have been inventoried and the project initiated within the last 15 years.)
	Medium	Areas within 300' foot corridor along roads/trails that have "medium" predictive level (4 - 6) for presence of prehistoric cultural resources; AND have little or no archaeological survey (to be considered adequately surveyed, AND 75% or more of the 300' corridor has been inventoried and the project initiated within the last 15 years)
	Low	Areas within 300' corridor along roads/trails with "low" predictive level (0-3) for presence of prehistoric cultural resources, OR archaeological inventory completed within 300' corridor with no or only ineligible cultural resources identified. To be considered adequately surveyed, 75%+ of the 300' corridor must have been inventoried and the project initiated within the last 15 years.
Social Conflict Potential (Trails only)	High	Heavy amount of non-motorized trail use or known user group conflicts
	Medium	Moderate amount of non-motorized trail use or user group conflicts
	Low	Low amount of non-motorized trail use or known user group conflicts

ISSUE	RATING	CRITERIA GUIDELINES
BENEFITS		
Motorized Recreation Use	High	Roads/trails frequently used for motorized recreation activities (includes sightseeing, 4X4, ATV, motorcycle).
	Medium	Roads/trails occasionally used for motorized recreation activities.
	Low	Roads/trails rarely or never used for motorized recreation activities, mostly ML1/closed roads.
Recreation Access/Connectivity	High	Roads/trails that provide access to numerous or high value recreation opportunities, or connectivity to many other motorized routes.
	Medium	Roads/trails that provide access to some recreation opportunities or connectivity to some other motorized routes.
	Low	Roads/trails that provide access to limited recreation opportunities or do not connect to other motorized routes.
Forest Management Access- Timber	High	All roads within primary timber management areas OR major road arteries through non- timber harvest areas for access to primary timber areas. Roads through non-primary timber areas that are not precluded from treatment.
	Medium	All roads not designated as "High" or "Low" in non-primary timber areas.
	Low	Roads closed to other major roads, spurs <0.25 miles, or roads that do not provide additional access to timber management areas.

ISSUE	RATING	CRITERIA GUIDELINES
BENEFITS, continued		
Forest Management Access- Range	High	Roads used frequently by USFS personnel for grazing permit administration. Roads used annually to access fences, water developments, salting areas, and/or sheep camp sites.
	Medium	Roads used occasionally by USFS personnel for grazing permit administration or that need occasional maintenance (water developments, fences, etc.).
	Low	Roads rarely used for permit administration or with few to no structures in the allotment.
Forest Management Access – Easements and Authorizations	Low	Roads provide general forest access but are not included in or encumbered by any right of way, easement or other special use authorization.
	High	Roads provide access for permitted uses or private land ingress/egress. Roads are included in or encumbered by one or more rights of way, easements or other special use authorizations.
Emergency Access and emergency egress	High	Roads/trails used frequently or likely needed for emergencies such as fire suppression, search and rescue, etc.
	Medium	Roads/trails infrequently used or needed for emergencies.
	Low	Roads/trails that are rarely used and will likely not needed for emergency access.

Once a numerical value was assigned to each category, the average overall risk or benefit rating was calculated. Those rankings with a value of $\geq$2.5 are assessed as "High", those between 2.5 and 1.5 are assessed as "Medium", and those rankings < 1.5 are considered to have a "Low" risk or benefit.

The first step for making a recommendation on whether to keep ("Y") a road or not ("N") was also based on a mathematical formula. If the road "Benefit – Risk" score was greater than -0.70, then the road received a "Y" to keep. If the score was -0.70 or less, the road received an "N", recommended to not keep. The second step included review of all road and trail segments by the IDT to determine if the recommendation was reasonable, based on field and professional knowledge. Thus, not all recommendations are based solely on results of the mathematical formula.

For additional information on the rationale and methodology employed by specialists in the evaluation process, see Appendix C.

Results

The analysis resulted in 9 possible risk/benefit pairs:

High Risk/High Benefit;
High Risk/Medium Benefit; High Risk/Low Benefit;
Medium Risk/High Benefit;
Medium Risk/Medium Benefit;
Medium Risk/Low Benefit;
Low Risk/High Benefit;
Low Risk/Medium Benefit; and
Low Risk/Low Benefit.

Table 5: Road Miles in Each R/B Category

Risk/Benefit Ratio	# miles	%
ML4 Roads		
Medium Risk/High Benefit	29.70	91%
Medium Risk/Medium Benefit	0.62	2%
Low Risk/High Benefit	0.80	3%
LowRisk/Medium Benefit	1.41	4%
Total	32.53	100%
ML3 Roads		
Medium Risk/High Benefit	70.44	93%
Medium Risk/Medium Benefit	3.75	5%
Low Risk/High Benefit	1.30	2%
Total	75.59	100%
ML2 Roads		
High Risk/Medium Benefit	2.50	4%
Medium Risk/High Benefit	18.33	27%
Medium Risk/Medium Benefit	39.21	58%
Medium Risk/Low Benefit	6.43	9%
Low Risk/Medium Benefit	0.55	1%
Low Risk/Low Benefit	0.80	1%
Total	67.82	100%
ML1 Roads		
Medium Risk/High Benefit	19.78	10%
Medium Risk/Medium Benefit	74.82	37%
Medium Risk/Low Benefit	100.38	49%
Low Risk/Medium Benefit	2.67	1%
Low Risk/Low Benefit	5.78	3%
Total	203.43	100%

Table 6: Trail Miles in Each R/B Category

Risk/Benefit Ratio	# miles	%
Motorized Trails		
Medium Risk/High Benefit	23.23	85%
Medium Risk/Medium Benefit	4.20	15%
Total	27.43	100%

STEP 5: OPPORTUNITIES AND PRIORITIES

Maintenance Options

Maintain As Is

Retain in current condition or, through more frequent maintenance, slightly improve road surface, drainage, and clearing widths.

Better Maintenance and/or Storm-proofing

Maintain the road but minimize long-term costs and the potential for resource damage through installation of drainage dips and similar features. Usually, the benefits of expending some funds now significantly exceed costs of future, and often more expensive, repairs.

Convert to Another Use

Convert some roads to another use, such as a motorized or non-motorized trail. While this eliminates the need to maintain a road, it shifts the burden (usually a smaller one) to another program area, such as trails.

Close to Motorized Use
Close roads with little to no immediate benefit but retain on the system for future forest management. This eliminates short-term costs, although there may be initial costs to ensure a road is "self-maintaining" for the next 10-30 years.

Decommission
Decommission roads that are no longer needed, removing them from the system (i.e., taking away the number). This eliminates all future maintenance costs; there may be one-time costs to decommission.

Road Recommendations
The general recommendations for each of the 9 risk/benefit categories are described below. They do not necessarily apply to all roads within each category; Appendix E lists our recommendation for each road.

High Risk/High Benefit
High Risk/High Benefit roads typically receive the highest priority for maintenance and mitigation. They should probably be retained with mitigation of resource impacts as soon as possible. There are no roads on the Yampa Ranger District within this category.

High Risk/Medium Benefit
High Risk/Medium Benefit roads should either be closed or given high priority for mitigation of resource impacts. The Pine road (FR 264.1), an ML2, on the Yampa District is in this category. The first 2.5 mile segment of this road is recommended to be decommissioned.

High Risk/Low Benefit
There are no roads on Yampa that fall into this category.

Medium Risk/High Benefit
Medium Risk/High Benefit roads should also be given a high priority for maintenance to reduce the risk. Approximately 140 miles of road are in this category across nearly all Operational Maintenance Levels (ML4-ML1). While these roads negatively affect some resources, they also provide a high level of public and/or management benefit. All roads in this category are recommended to be retained.

Medium Risk/Medium Benefit
Medium Risk/Medium Benefit roads should probably receive mitigation and maintenance, though secondary in priority to roads with higher benefits or higher risks. There are approximately 120 miles of road in this group, again across nearly all Operational Maintenance Levels. These roads create some resource impacts but also provide benefits. Typically, they are important for public access and resource management. The District recommends about 7 miles of ML2 and ML1 roads in this category be decommissioned.

Medium Risk/Low Benefit
Medium Risk/Low Benefit roads were recommended for closure, decommissioning, or mitigation and maintenance. Approximately 105 miles fall into this category, with the majority (94%) being ML1 roads. Approximately 30 miles of roads in this category are recommended for decommissioning.

Low Risk/High Benefit
Low Risk/High Benefit roads have benefits and should be retained. Only 2 miles of road are in this category, which include only ML 4 and ML3 roads; Red Dirt Reservoir (FR 101.1), Milk Creek (FR 131.1), and Chapman Reservoir Camp Ground (FR 940.1A).

Low Risk/Medium Benefit
Low Risk/Medium Benefit roads should also be retained in light of their importance and relatively low resource risk. There approximately 5 miles of road on the District in this category.

Low Risk/Low Benefit

Low Risk/Low Benefit roads need to be further evaluated for maintenance, closure, or decommissioning. Since the risks are low, they are not a priority. There approximately 7 miles of these roads on the District; all are recommended to keep.

Motorized Trail Recommendations

Appendix F lists each motorized trail, its risk and benefit rankings, and recommendations. Suggested actions fell into two risk/benefit categories, in which all 27 miles are currently recommended to be retained.

This analysis was confined to the existing motorized trail system and did not include opportunities for system expansion through new construction, adoption of non-system routes, or re-designation of non-motorized trails. Such additions to the system could certainly be included in future analyses.

Medium Risk/High Benefit

Trails in the Medium Risk/High Benefit category should be given highest priority for mitigation of resource impacts. The majority of trails, 23 miles, fall into this category.

Medium Risk/Medium Benefit

Medium Risk/Medium Benefit trails also deserve mitigation and maintenance, though secondary in priority. The remaining 4 miles of motorized trails on the District are in this category.

Step 6: Yampa Ranger District Recommended Minimum Road System

A minimum road system is that which is needed for safe, efficient travel and for administration, use, and protection of National Forest System lands (36 CFR 212.5(b)(1)). Accordingly, that system must meet the Forest Service mission by providing basic access for forest management, recreation, and use of forest resources. Closed roads that are wanted for future forest management or current access by Special Use permittees are included.

Funding of routine maintenance on many Forest roads has been insufficient for a long time; deferred maintenance backlogs are even greater. Due to widely varying conditions of use, terrain, soil type, and weather, there is no precise amount of road and trail maintenance that can be reasonably predicted far into the future. At the least, roads open to passenger cars are subject to Highway Safety Act requirements and must be maintained to prevent significant resource damage. Beyond those requirements, however, there is great discretion in how roads are managed and, therefore, considerable variance in how many miles can be sustained within a given budget. Nonetheless, it appears likely that future allocations will make it difficult to keep the existing system at a modestly acceptable level. Reducing the overall size of the road system will allow better maintenance of what is left.

It is also important to note that the road system determined to be the minimum is not static. The suggested minimum road system developed in this process represents our best estimate at this time. It is impossible to predict what routes might be needed “down the road”. We expect our minimum road system will continue to be updated, adjusted, and revised as conditions warrant. Future NEPA analyses will certainly consider the recommendations in this report and implement or revise them based on more site specific information.

Process

In addition to the Risk/Benefit Matrix, the IDT considered the following in identifying the minimum road system:

- Are there any non-system routes that should be part of the road system?
- Are there duplicate Forest roads that lead to the same area? If so, should one of those be closed, eliminated, or converted to a different use?
- How are the mix of risks and benefits related? Realizing that not all hazards and beneficial outcomes are equal, how can past experiences with maintenance of a particular road be used to predict future success?

Future Actions

The recommendations that resulted from this final integration of all considerations are in Appendix E, "Comments". These include changes to roads that are open to public motorized use, as well as to roads that are currently closed. Some roads are recommended to be removed from the system.

Mileages for the proposed minimum road system compared to the existing condition are shown in Table 7; a map of the recommended road system is Appendix D. Although the recommended road system does not greatly reduce total miles, it does create a more efficient road network that better reflects our resource and management objectives while minimizing adverse environmental impacts. Maintenance costs are expected to decrease slightly.

Table 7: Mileages of Recommended Minimum Road System Compared to Existing Road System

Maint. Level	Current	Min. Road	Difference
5	0	0	0
4	32.53	32.53	0
3	75.59	75.59	0
2	67.82	62.57	-5.25
1	203.43	169.11	-34.32
Total	**379.37**	**339.80**	**-39.57**

Table 8: Recommended Changes to Motorized Trail System (miles)

Trail Use	Current	Retained	Roads Converted To Trails	Total	Difference
Open to All Vehicles	27	27	0	27	0
Single-track Motorized	0	0	0	0	0
Total	27	27	0	27	0

Creating a road network to match fluctuating annual appropriations only by closing and decommissioning roads and trails will probably not result in a comprehensive transportation system that meets the needs of the public and agency. The District will continue to pursue opportunities to transfer jurisdiction and maintenance responsibilities of some roads to the State or County. We will also seek improved, sustainable designs, use seasonal closures, apply for grants, recruit volunteers, and employ youth conservation corps trail crews to aid maintenance efforts.

While none of these approaches resolves every concern, taken as a whole, we believe the recommendations, maintenance priorities, and strategies in this Report will result in a better, more cost-effective system.

Report Approval

Prepared by:	*/s/ William H. Baer*, Co-IDT Leader	March 4, 2015
Reviewed by:	*/s/ Paula Guenther*, South Zone Coordinator	March 27, 2015
Recommended by:	*/s/ Jason M. McInteer*, Acting District Ranger	March 30, 2015
Approved by:	*/s/ Carolyn Upton*, Deputy Forest Supervisor	April 20, 2015

APPENDIX A: FOREST PLAN DIRECTION

FOR MANAGEMENT AREAS WITHIN THE YAMPA DISTRICT

Forest-wide Direction

Soils

Standards

1. Limit roads and other disturbed sites to the minimum feasible number, width, and total length consistent with the purpose of operations, local topography, and climate.
2. Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands.
3. Stabilize and maintain roads and other disturbed sites during and after construction to control erosion.
4. Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage.

Administrative Infrastructure – Travelways

Standards

1. Use restricted roads for administrative purposes when:
    a. Prescribed in management prescription.
    b. Authorized by Deciding Officer.
    c. In case of emergency.
2. Allow motorized use on new or designated travelways unless a documented decision shows that:
    a. Motorized use conflicts with the purpose for which the travelways were constructed.
    b. Motorized use is incompatible with the ROS class.
    c. Travelways are located in areas closed to motorized use and are not "designated routes."
    d. Motorized use creates user conflicts that result in unsafe conditions unrelated to weather.
    e. Physical characteristics of travelways preclude any form of motorized use.
    f. Financing is not available for maintenance necessary to protect resources.
3. Prohibit motorized access from private land where access for the general public is not available, except by special use permit.

Management Area Prescriptions: Transportation

MA 1.11, Wilderness, Pristine
Standard Prohibit motorized use.

MA 1.2, Wilderness, Primitive
Standard Prohibit motorized use.

MA 1.13, Wilderness, Semi-Primitive
Standard Managed for non-motorized uses.

MA 1.32, Backcountry Recreation, Nonmotorized with Winter Limited Motorized
Guideline Permit motorized vehicles on a limited, case-by-case basis to facilitate management activities.

MA 1.5, National River System, Wild Rivers Designated and Eligible

Standards — Restrict motorized used to designated routes.

Do not allow new road construction.

MA 2.2, Research Natural Areas

Standards — Prohibit motorized use, except when it provides necessary access for scientific or educational purposes.

Prohibit the construction of new trails, except where construction of new trails is necessary to correct resource damage from existing trails.

Guideline — Close or obliterate existing roads, except where they provide necessary access for scientific or educational purposes.

MA 4.2, Scenery

Guideline — Design proposed roads and trails to blend with the landscape.

MA 4.3, Dispersed Recreation

Guideline — Design proposed roads and trails to blend with the landscape.

MA 5.41, Deer and Elk Winter Range

Standard — Prohibit motorized traffic during the winter and spring.

Guidelines — Construct only low standard local and primitive roads to implement management or reclamation in this area. Close new roads to motorized use when no longer needed.

Avoid crossing these areas with arterial and collector roads. When crossing cannot be avoided, implement mitigation measures to protect wildlife values.

MA 8.3, Utility Corridors and Electronic Sites

Guideline — Issue road permits to utility/electronic site permittees where necessary. Access roads may be closed to public use.

APPENDIX B: ROAD AND TRAIL MAINTENANCE COSTS

Keeping fixed assets, such as roads or trails, in acceptable condition includes preventive maintenance, replacement of parts and structural components, and other activities to provide service. Routine maintenance excludes expanding or upgrading the asset. Unscheduled or catastrophic failures are, ideally, repaired immediately. And, in keeping with the 2009 Manual of Uniform Traffic Control Devices ("MUTCD"), all new signs are/will be retro-reflective.

By definition, deferred maintenance was not performed when it should have been. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value.

Budget

The Medicine Bow - Routt National Forests and Thunder Basin National Grassland (MBRTB) appropriated "CMRD" budget for road maintenance and management of roads is shown below (rounded to the nearest thousand dollars). Of these amounts, approximately 70% is spent on annual and deferred maintenance across the forests and grassland, with roughly 6% of that applied to road management on the Yampa District.

Table B1: CMRD fund allocations for road management in recent fiscal years.

FY2011	FY2012	FY2013	FY2014	FY2015
$1,270,000	$964,000	$1,550,000	$1,312,000	$1,138,000

Estimated costs include the Forest road crew and county cooperative agreements for dust abatement, asphalt patching, blading, etc. Being discretionary, road work done by contractors is not included. FY2013 accomplishment miles were used as a baseline. Costs were then divided by miles to calculate the average Forest cost per mile by maintenance level.

Maintenance Level 1 Roads

ML1 roads are closed to public motorized use and used infrequently for administrative purposes. Basic custodial care prevents damage to adjacent resources and perpetuates the road for future resource management needs. Emphasis is given to maintaining drainage. No maintenance other than a condition survey may be required as long as there is no potential for resource damage. Most of these roads are in a stable, revegetated condition with functioning drainage. Installation and maintenance of closure devices, such as gates, berms, and boulders, is often needed. In general, they cost very little to maintain.

Maintenance Level 2 Roads

ML2 roads are open for use by high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Warning signs and traffic control devices are usually absent, except at intersections. Motorists should have no expectations of being alerted to potential hazards while driving. Maintenance consists of managing the road prism for vehicle passage, providing appropriate drainage, removing/repairing slides and slumps, brushing, clearing fallen trees, and installing/repairing seasonal closures. ML2 roads range from [VERY] rocky roads that require little maintenance to deeply incised roads in erosive soils that require frequent attention. Some of these need armoring of drainage dips to handle traffic loads and minimize resource impacts. Condition surveys are done sporadically. Currently, only about 10% of the Forest's ML2 roads are maintained on an annual basis. Work typically includes reshaping dips, filling in deep ruts, pulling lead-off ditches, and cleaning culverts. The road crew spends the entire season just maintaining ML2 roads, which equates to about $107,250. In FY2013, this resulted in 165 miles of ML2 road maintenance for a Forest-wide cost per mile of $650.

Maintenance Level 3 Roads

ML3 roads are open for travel by a prudent driver in a standard passenger car. User comfort and convenience are not priorities. Warning signs and traffic control devices alert motorists to situations that exceed expectations. These roads are typically surfaced with aggregate but can be native surface. Drainage dips and culverts provide

drainage. Potholes or washboards may occur. The roads are subject to Highway Safety Act requirements. Maintenance guidelines include replacing the base and surfacing as needed, grading, cleaning ditches, cleaning/replacing culverts and cattle guards, removing fallen trees, controlling vegetation for sight distance, repairing/removing slides and slumps, installing/maintaining regulatory signs, and installing/repairing seasonal closures.

The Forest road crew strives to blade ML3 roads at least once a year. Cooperative agreements with counties help keep running surfaces smooth, as severe wash-boarding and potholes can cause drivers to lose control. The aggregate surface on some roads has deteriorated to a point that they can no longer be graded. Gravel that should have been replaced every 10 years has often gone beyond the 20 year mark. Fortunately, site specific surveys indicate that although these road surfaces are deteriorating, resource impacts are generally not occurring. Ditches are pulled only when the drainage is no longer functioning. ML3 road maintenance cost $365,700 in FY2013 at $1150 per mile.

Maintenance Level 4 Roads:

ML4 roads provide a moderate degree of user comfort and convenience at moderate speeds. Most are double lane and aggregate surfaced; some may be single lane with turnouts, while others are paved and/or dust abated. They are subject to requirements of the Highway Safety Act. Total cost is $636,000; $2000/mile.

Maintenance Level 5 Roads:

ML5 roads provide a high degree of user comfort and convenience. They are normally double lane with paved surfaces. Standards suggest chip seal or other surface treatment every 10 years ($100,000/mile; $27,000/year). Patching alone costs $25,000 Forest-wide. In FY2013, there was no ML5 maintenance.

Deferred Maintenance

Since 1999, the Forest has conducted road condition surveys to determine the actual cost of maintaining the road system to standard. We also estimated the cost of maintenance deferred in previous years due to lack of funding. Finally, work to bring roads up to the desired maintenance level was identified and documented. An example would be aggregate replacement on an ML3 road: 4" depth costs approximately $100,000/mi and is assumed to be needed every 10 years. In practice, any particular road may need aggregate more or less often, and a suitable aggregate surface may be adequately maintained by spot surfacing and dust abatement. Detailed surveys and investigation are required to optimize aggregate replacement and investment. Thus, deferred maintenance estimates in INFRA may not be indicative of the actual funding needed for adequate road maintenance.

Road Maintenance Costs

Average annual and deferred maintenance costs for the existing road system are displayed in the tables below. They vary widely from road to road based on site specific conditions. "Annual $/mile" was calculated by dividing the $/mile by the maintenance interval. The "Total $" columns for both annual and deferred maintenance were calculated by multiplying total miles by the Annual $/mile. The Engineering estimates are probably low while INFRA is high. Actual maintenance costs are likely between the two.

Table B2: Annual Maintenance Costs for Existing Road System

Maint. Level	Yampa Total Miles	Maint. Interval	Engineers' Est. $/mile/yr.[2]	INFRA $/mile/yr.	Engineers' Total $	INFRA Total $
1	203	20 years	-	$187	-	$37,961
2	68	5 years	$130	$580	$8,840	$39,440
3	76	Annually	$1,150	$5,610	$87,400	$426,360
4	33	Annually	$2,000	$12,000	$66,000	$396,000
5	0	Annually[3]	$4,000	$45,000	$0	$0
Total	380				$162,240	$899,761

[2] Forest avg. divided by maint. interval

[3] Includes patching annually; chip sealing or other surface treatment every 10 years.

Table B3: Deferred Maintenance Costs

Maint. Level	Existing Road System		
	Total Miles (Yampa District)	INFRA $/mile (Forest avg.)	Total $
1	203	$187	$37,961
2	68	$3,207	$218,076
3	76	$9,610	$730,360
4	33	$22,259	$734,547
5	0	$99,822	$0
Total	380		$1,720,944

Other Funding Sources

Commercial undertakings, such as timber sales, oil and gas wells, hauling from private lands, etc. are either charged a fee for road use or are required to help maintain the road(s) being used. A limited amount of road maintenance or decommissioning may also occur after timber sales are complete through the collection of Knudsen-Vandenberg (KV) funds.

In the 2000s, American Recovery and Reinvestment Act (ARRA) funding was used for some surface replacement on paved roads, surface rock replacement on gravel roads, gate installation, and road decommissioning. In addition, Forest Service Legacy Funding is requested every year for major road maintenance and drainage improvements.

Trail Maintenance

The MBRTB "CMTL" fund allocation for management of both motorized and non-motorized is shown below (rounded to the nearest thousand dollars). Funding is distributed among the 6 Districts and Supervisor's Office according to allocation criteria based largely on total trail miles. The Yampa District has historically received approximately 20% of the Forest allocation.

Table B4: CMTL fund allocations for trail management in recent fiscal years.

FY2011	FY2012	FY2013	FY2014	FY2015
$487,000	$304,000	$736,000	$582,000	$577,000

Since the cost to maintain the trail system is usually higher than the amount allocated, maintenance is generally reserved for the most heavily used trails. The result can be a downward spiral in condition of less-used trails, which receive less maintenance, which receive even less use, and so on. Meanwhile, the number of downed trees due to the bark beetle epidemic has increased nearly 5 fold. Maintaining any trail "to standard" (truly, hazard free) is nearly impossible at this time.

Nevertheless, most trails on Yampa District receive some attention at least every other year by District employees and/or volunteers. The State of Colorado trail crew also helps to maintain motorized trails.

APPENDIX C: RISK/BENEFIT ANALYSIS RATIONALE

RISKS

Condition/Maintenance and Repair Costs

Road and motorized trails were rated based on their existing condition. Routes in good condition were considered to meet standards. Although all require routine maintenance, routes in poor condition usually have significant deferred maintenance and require major repair. Routes in poor condition often cause soil and watershed impacts as discussed below.

Aquatic Organism Passage

Traditionally culverts and other road-stream crossings were designed and constructed to pass the most amount of water for the least amount of money, often without consideration of the structure's ability to allow aquatic organism passage (AOP). Road crossings can act as barriers to nearby aquatic and terrestrial species usually resulting in habitat fragmentation and reduced population connectivity. Eventually the aquatic and terrestrial organism populations may decline as access to important microhabitat types (spawning areas or cover) becomes increasingly difficult or impossible. There is a need to restore stream connectivity at road-stream crossing that act as biotic barriers.

Water Resources

Roads and motorized trails affect water resources primarily by moving sediment from the route surface into streams or wetlands. Routes with poor drainage can develop mud holes, which deepen and churn up sediment every time vehicles pass. Poor location exacerbates watershed impacts. For example, a route that is adjacent to and parallels a stream is more likely to direct sediment into the water than a route further away.

Drainage structures need to be inspected and maintained on a regular basis to remain functional. Inadequate maintenance can result in increased sediment to streams or wetlands, especially if structures, such as culverts, become plugged and fail. Open roads and trails are generally devoid of vegetation and have compacted surfaces causing greater runoff; closed roads are usually vegetated and thus, provide sediment filtering.

The Watershed Condition Framework (WCF) was used to the maximum extent possible to estimate the watershed risk ratings. The WCF "Road and Trail Condition Rating Rule Set", specifically the overall "Road and Trail Condition Indicator" and the "Open Road Density" and a modification of the "Proximity to Water", attributes were used to develop rating criteria. Site-specific road information and professional judgment were used to adjust the rating when appropriate.

Soil/Geologic Hazards

Roads and motorized trails affect soils primarily by causing erosion and loss. Erosion increases in areas with less stable soils and steep slopes. Poor route location, inadequate drainage structures, and inadequate maintenance exacerbate soil impacts. Roads and motorized trails can affect the likelihood of landslides, slumps, mudflows, or rock falls (to say nothing of the budget to repair them!)

Wildlife

Wildlife ratings focused on risks to habitat rather than risks to species, as many species use the diversity of habitats across the District, and species response to motorized travel varies tremendously. A risk rating that emphasized disturbance impacts to species would not suffice for all species, and a risk rating that considers risks to both habitat and species would be difficult as routes cross multiple habitats used by multiple species.

The effect of roads and motorized trails on suitable wildlife habitat depends on factors such as the location of the route, road and/or motorized trail densities, and amount and type of use occurring. All forest management activities can, negatively or positively, affect wildlife habitat depending on whether it is a key habitat (riparian and wetlands), and how the habitat is used (foraging, breeding, security, escape, etc.)

Based on the above rationale, wildlife risks were determined by the road and motorized trail density within a square mile of each route. Risks were categorized only for National Forest roads or motorized trails. However,

state highways, county roads, and BLM roads that adjoin the Forest were included in the calculation of road density.

Invasive Species

Motor vehicle use has great potential to, and often, spreads invasive species by dispersing the seed source. Risk ratings were tied to both the size and distribution of existing noxious weed populations, as well as the potential for spread. Only invasive species on the Colorado Noxious Weed List were considered.

Cultural Resources

Roads and motorized trails have the potential to affect historic properties. Impacts are most often within the route surface itself, as cultural sites are exposed and damaged through construction, maintenance, and use. Historic sites outside of the route itself, such as rock art, structures, and artifacts, are most often affected by the convenient access. Most roads and trails in use since before the 1966 National Historic Preservation Act, were built without consideration of these effects. In addition, many routes have not been formally inventoried for the presence of cultural resources or National Register of Historic Places evaluation standards. There are likely still unknown or undocumented sites that are, or could be, impacted by road use and maintenance.

The process used to assign risk ratings for the current analysis involved consulting GIS map layers and other available information to determine if a road or area had been inventoried according to current professional standards. Only roads and trails built less than 15 years ago are generally considered adequately surveyed.

The GIS model used to identify probability for effecting resources is only valid for consideration of *pre*historic sites. It is based on topographic characteristics including slope, distance to water lakes and streams, and vegetation. If the model resulted in multiple predictive levels along the length of the route, the most frequently occurring level was chosen. Unfortunately, the MBRTB has not developed a digital model to predict presence of historic resources. This includes historic roads and trails not previously identified and recorded as historic cultural resources. The MBRTB has also never conducted Traditional Cultural Property surveys or assessments so there is no ability to determine the effect of roads/trails on this property type.

Social Conflict (motorized trails only)

The use of motor vehicles on trails is viewed by some non-motorized users as disruptive to their recreational pursuits and experiences. Providing recreation opportunities that minimize these types of user group conflicts is a challenge. Non/motorized use levels and social conflict assessments were based on the combined professional judgment and field experience of District specialists, as there was little quantitative use data available.

BENEFITS

Motorized Recreation Use

To evaluate the general level of benefit provided by each road or motorized trail, each route was rated according to its present level of use. As above, use levels were based on the combined professional judgment and field experience of the District specialists, due to lack of quantitative data on actual road and motorized trail usage.

Recreation Access/Connectivity

Roads and motorized trails are often used to access other recreational activities, such as hiking, camping, hunting, firewood gathering, rock collecting, etc. To evaluate this type of benefit, roads and motorized trails were assigned ratings based on the number of connections to other motorized routes.

Forest Management Access- Timber

The Routt Forest land base is divided into land Management Areas (MAs). Each MA has a certain emphasis to direct management activities. MAs include specific direction, standards, and guidelines. All roads were rated based on the emphasis for the given MA in which they were located.

- All roads within MAs that emphasize timber management, MAs 5.11 and 5.13, were designated as having a high benefit. Also, major arteries through non-primary timber areas (MAs 1.33, 3.31, 3.5, 3.54, 3.56, 3.58, 4.2,

5.12, 5.41, and 5.42) that provide access to MAs 5.11 and 5.13 were also designated high benefit. Finally, roads through non-timber emphasis areas that do not preclude treatment were designated high. These areas were represented spatially to ensure there was good access to all portions with lesser road density than primary timber areas.

- Roads in MAs where commercial timber harvest is not a priority were designated as a moderate (2) benefit.
- Roads that are close to other major roads, <0.25 miles in length, or that provide no additional access or contribute to timber management were rated low (1). Roads where timber harvest is specifically precluded or that access administrative sites were also considered to have minimal benefit for this category.

Forest Management Access- Range

Many motorized routes are used by district personnel and range permittees to manage grazing allotments. Ratings were based on whether roads and trails assist in the movement of livestock or help ranchers maintain fences and water developments.

Forest Management Access- Easements and Authorizations

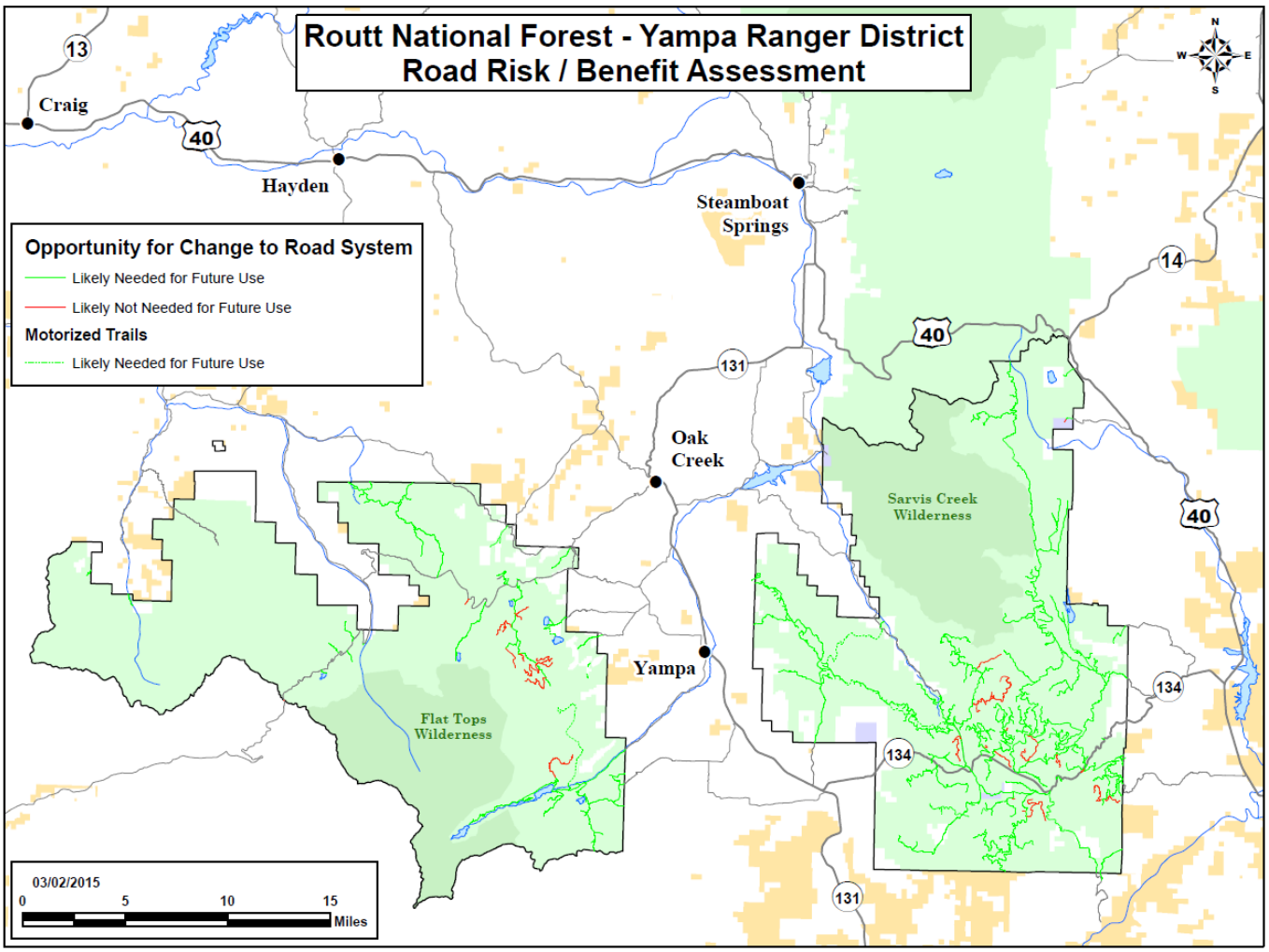
Specific motorized routes are used by private land owners and authorized permittees to access inholdings and facilities. Ratings were based on whether roads and trails were specified in legal access authorizations including rights of way, easements or special use authorizations.

Emergency Access

Roads and motorized trails were rated as to their benefit for emergency access to/from communities, inholdings, campgrounds, administrative sites, etc. In a very few situations, a road was given a moderate rating where it provided entry to a large area which was otherwise void of motorized access.

Past and expected future emergency access use levels were based on the combined professional judgment and field experience of the District specialists, as there was little quantitative data available.

APPENDIX D: RECOMMENDED MINIMUM ROAD SYSTEM MAP



APPENDIX E: ROADS MATRIX RECOMMENDATIONS

See “YAMPA TAP FINAL ROADS MATRIX.pdf”.

APPENDIX F: TRAILS MATRIX RECOMMENDATIONS

See “YAMPA TAP FINAL TRAILS MATRIX.pdf”.